

REMARKS

Claims 1-6, 8-11 and 13 are pending. By this Amendment, Claim 7 is canceled without prejudice or disclaimer and Claims 1, 8 and 13 are amended. Support for the amendments to Claim 1 is provided in previously pending Claim 7 and Figures 6-7 of the instant application, as originally filed. As such, Applicants respectfully submit that no new subject matter is presented.

Claims 1-6 8-11 and 13 Recite Patentable Subject Matter

Claims 1 – 4 and 11 are rejected under 35 U.S.C. §102(b) as being anticipated by United States Patent No. 5,884,009 to Okase. Claims 5-10 are rejected under 35 U.S.C. §103(a) as being unpatentable over Okase in view of U.S. Patent Number 5,884,009 to Wataru. Claim 13 is rejected under 35 U.S.C. §103(a) as being unpatentable over Okase in view of Wataru and further in view of U.S. Patent Number 6,817,377 to Reimer et al. (Reimer).

Applicants respectfully traverse the rejections for the following reasons.

Claim 1 recites a film-forming apparatus in which a gas mixture prepared in a gas-mixing chamber is introduced into a film-forming chamber through a shower head to form a film on a substrate the apparatus comprising the gas-mixing chamber for admixing a raw gas and a reactive gas, the film-forming chamber connected to the gas-mixing chamber, the shower head disposed on the top face of the film-forming chamber, a stage arranged in the film-forming chamber for placing the substrate to be processed and capable of freely going up and down ***so that the distance between the shower head and the substrate to be processed (S/S distance) satisfies the following***

relation: $25\text{mm} \leq \text{S/S distance} \leq 35 \text{ mm}$, and a supply port disposed at the peripheral portion on the bottom face of the gas-mixing chamber supplying the gas mixture prepared in the gas mixing chamber directly to the top face of the shower head such that the gas mixture prepared in the gas-mixing chamber and fed to the shower head through the peripheral portion on the top face of the shower head flows towards the central portion of the shower head, wherein an exhaust port for discharging the exhaust gas from the film-forming chamber is formed in a side wall of the film-forming chamber at a position located below the level of the stage at an up position and having an opening extending in a direction that is **parallel** relative to the direction in which the stage is raised and lowered, and **wherein the distance between the shower head and the substrate to be processed (S/S distance) and a diameter of the shower head satisfies the following relation: $(\text{S/S distance}) \times 5 < (\text{diameter of the shower head}) < (\text{S/S distance}) \times 10$** , and wherein the diameter of the shower head satisfies the following relation: $200\text{mm} \leq \text{diameter of the shower head} \leq 250\text{mm}$.

Claim 13 recites a feature recited by Claim 1 and discussed above.

Applicants respectfully submit that Okase fails to disclose, teach or otherwise suggest such a feature. As noted above, Claim 1 has been amended to incorporate therein features recited by previously pending Claim 7 and features illustrated and/or derived from Figures 6-7.

Applicants note the Office Action essentially **admits** that Okase fails to teach or suggest the relative distance between Okase's substrate (W) and the showerhead (7c). However, the Office Action asserts that it would have been obvious to one of ordinary

skill in the art at the time the invention was made to optimize Okase's relative apparatus dimensions and Okase's parameters, as the person of ordinary skill in the art would be motivated to do so in order to optimize Okase's relative apparatus dimensions and Okase's operating parameters to generate a uniform thickness of the film deposited on the substrate (W). The Office Action cites column 13, lines 20-30 as allegedly supporting the motivation argument.

However, Applicants respectfully submit that column 13, lines 20-30 of Okase makes clear that the uniform thickness of the film deposited onto the substrate (W) is controlled not by the distance between the substrate (W) and showerhead (7c), but by the process gas supply unit (5) controlling the flow of the process gases through the gas supply holes (52b), which correspond to the holes (73b) formed in the showerhead (7c). In other words, Okase already ensures a uniform thickness of the film on the substrate (W), but does by controlling the flow rate of the gases through the showerhead (7c) and not by altering the dimensions of the distance from the showerhead (7c) to the substrate (W).

Put simply, if Okase already provides a uniform thickness of film on a substrate (W) by controlling the flow rate of gas through the showerhead (7c), Applicants submit one of ordinary skill in the art would not be motivated to adjust or otherwise alter the dimension from the showerhead (7c) to the substrate (W) in order to achieve a desired result, i.e., the uniform distribution of the film on the substrate (W), because Okase *already* achieves the supposedly desired result.

The Office Action further asserts that adjusting the relative distance from the showerhead (7c) to the substrate (W) would have been obvious to one of ordinary skill in the art in order to optimize the operation of the claimed invention. However, as noted above, the optimized effect that would be obtained by supposedly adjusting the distance from the showerhead (7c) to the substrate (W) is already achieved, i.e., the uniform distribution of the film on the substrate (W), but is achieved by controlling the flow rate of the gas flowing through the showerhead (7c) and not by adjusting or otherwise altering the dimension between the showerhead (7c) and the substrate (W).

The Office Action, citing M.P.E.P. §2144.04, states that it is well established that changes in apparatus dimensions are within the level of ordinary skill in the art. Applicants respectfully submit that it is also well established that such an argument of obviousness can be rebutted by showing the criticality of the claimed range. See M.P.E.P. §2144.05(III). As explained on pages 19-20 of the originally filed application and illustrated in Figures 6-7 therein, the claimed ranges recited by pending Claim 1 result, unexpectedly, in permitting or facilitating the continuous formation of films on the substrate, each having a uniform thickness, which had a uniform plane distribution on the wafer surface, thereby leading to an improved yield of semiconductor chips. Moreover, as shown in Figures 6-7, the in-plane thickness distribution of the film remains at or below 10%, which is extremely desirable and not achieved by the Okase apparatus.

For at least the reasons provided above, Applicants respectfully submit that Claim 1 is not rendered obvious in view of the teachings of Okase and what is asserted for supposedly being obvious to adjust or modify to one of ordinary skill in the art.

Reimer does not cure or otherwise address the above described deficiencies of Okase.

For the reasons discussed above, Okase alone does not anticipate the invention recited by Claim 1 and the Okase and Reimer combination does not render the invention recited by Claim 1 obvious.

As such, Applicants respectfully submit that Claim 1 should be deemed allowable.

Claims 2-6, 8-11 and 13 depend from Claim 1. It is respectfully submitted that these dependent claims be deemed allowable over Okase and Reimer for at least the same reasons Claim 1 is allowable as well as for the additional subject matter recited therein.

Withdrawal of the rejections is respectfully requested.

Conclusion

In view of the foregoing, reconsideration of the application, withdrawal of the outstanding rejections, allowance of the Claims 1-6, 8-11 and 13, and the prompt issuance of a Notice of Allowability are respectfully solicited.

Should the Examiner believe anything further is desirable in order to place this application in better condition for allowance, the Examiner is requested to contact the undersigned at the telephone number listed below.

In the event this paper is not considered to be timely filed, the Applicants respectfully petition for an appropriate extension of time. Any fees for such an extension, together with any additional fees that may be due with respect to this paper, may be charged to counsel's Deposit Account No. 01-2300, **referencing docket number 026390.00009.**

Respectfully submitted,
ARENT FOX LLP

A handwritten signature in black ink, appearing to read 'Murat Ozgu', with a long horizontal flourish extending to the right.

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Enclosure: Petition for Extension of Time (3 months)